Grade 10 Mathematics Lesson Plan

Probability in Real-Life

Strand:	Statistics and Probability
Sub-Strand:	Probability 1: Probability in Real-Life
Specific Learning Outcome:	Identify the range of probability in different situations, Appreciate the application of probability in real-life situations
Duration:	40 minutes
Key Inquiry Questions:	How is probability applied in real life situations?
Learning Resources:	CBC Grade 10 textbooks, chart paper, markers, real-world scenario cards

Phase 1: Problem-Solving and Discovery (15 minutes)

Anchor Activity: Weather Station Field Trip

Objective: Students work in groups to explore how probability is used in real-life decision-making, focusing on weather forecasting.

Work in groups to discuss the following scenario:

Grade 10 learners went on a field trip to a weather station to learn about how meteorologists use probability to predict the weather.

The weather forecast says: There is a 70% chance of rain tomorrow.

Discuss and answer the following questions:

- (a) What does 70% probability mean?
- (b) Should students carry an umbrella? Why?
- (c) Does 70% probability guarantee that it will rain? Explain your answer.
- (d) What could happen if you ignore the probability?
- (e) How do people use probability in daily life without realising it?
- (f) Share your work with the class.

Discussion prompts for teachers:

- What does 70% mean in everyday language?
- Is 70% a high or low probability? How do you know?
- Can you think of other situations where we use percentages to make decisions?
- What's the difference between "likely" and "certain"?

- What examples of probability have you seen today? (traffic, sports, weather)

Phase 2: Structured Instruction (10 minutes)

Key Takeaways

1. Probability in Real-Life
Probability is used in real-life situations to make predictions and informed decisions.

2. Nine Real-World Applications
1. Weather forecasting: Meteorologists use probability to predict the likelihood of rain, sunshine, or storms.

2. Sports: Coaches and analysts use probability to assess the chances of winning a game or making a successful play.

3. Quality control: Manufacturers use probability to determine the likelihood of defects in their products and to improve their production processes.

4. Traffic management: Authorities use probability to analyze traffic patterns and make decisions about road construction and traffic light timing.

5. Gambling: Players use probability to calculate the odds of winning a bet or a lottery.

6. Healthcare: Doctors use probability to assess the risk of diseases and determine the best treatment options for patients.

7. Finance: Investors use probability to evaluate the potential returns and risks of different investments.

8. Elections: Political analysts use probability to predict the outcome of elections based on polling data and historical trends.

9. Everyday decision-making: Individuals use probability to assess the risks and benefits of various choices, such as whether to carry an umbrella or not based on the chance of rain.

3. Key Understanding
- Probability helps us make informed decisions, but it does NOT guarantee outcomes.
- High probability (like 80%) means "very likely" but not "certain".
- Low probability (like 5%) means "unlikely" but still possible.
- We use probability every day without realizing it!

Phase 3: Practice and Application (15 minutes)

Worked Example 3.2.34 (Revision Session Time Slots)
Problem: A class of 30 students is planning a revision session for their upcoming exams. They have three time slots to choose from: 4 PM, 5 PM, and 6 PM. The students were asked to vote for their preferred time slot, and the results are as follows:

- 12 students prefer 4 PM
- 10 students prefer 5 PM
- 8 students prefer 6 PM

Based on the votes, determine the probability of each time slot being chosen for the revision session.

Solution:

Step 1: Identify the total number of students

Total students = 30

Step 2: Calculate probability for each time slot

Probability = (Number of votes for that time) / (Total students)

Probability of 4 PM = 12/30 = 2/5 = 0.4 (40%)

Probability of 5 PM = 10/30 = 1/3 ≈ 0.33 (33%)

Probability of 6 PM = 8/30 = 4/15 ≈ 0.27 (27%)

Answer: 4 PM has the highest probability (40%), so it is most likely to be chosen.

Phase 4: Assessment (5 minutes)

Exit Ticket

1. A weather report states that the probability of rain is 0.8.

   (a) Should farmers prepare for rainfall?

   (b) Explain your answer.

   (c) Does 0.8 mean it will definitely rain?

2. In a manufacturing factory, the probability that a product is defective is 0.02.

   (a) What does 0.02 mean?

   (b) Out of 100 products, how many are expected to be defective?

   (c) Why is probability important in quality control?

Differentiation Strategies

For Struggling Learners:
- Use visual probability scales (0 to 1) with labels: impossible, unlikely, equally likely, likely, certain.

- Provide real-world scenario cards with probabilities already calculated.
- Use percentages instead of decimals (70% instead of 0.7).
- Connect to familiar experiences: "How likely is it to rain today?"
- Work in groups with peer support.
- Focus on interpreting probabilities rather than calculating them.

For Advanced Students:
- Research how probability is used in a specific career (medicine, engineering, finance).
- Calculate expected values: If P(defect) = 0.02, how many defects in 1000 products?
- Explore conditional probability in real-world contexts.
- Investigate how insurance companies use probability to set premiums.
- Analyze real weather data and compare predictions with actual outcomes.
- Create their own real-world probability scenarios and present to the class.

Extension Activity: Probability Career Exploration

Scenario: Explore how professionals use probability in their daily work.

Choose one of the following careers and research how they use probability:

- Doctor or nurse (disease risk, treatment success rates)
- Weather forecaster (predicting rain, storms, temperature)
- Sports analyst (predicting game outcomes, player performance)
- Insurance agent (calculating premiums based on risk)
- Quality control manager (detecting defects in products)
- Financial advisor (investment risks and returns)

Tasks:

1. Research: How does this professional use probability in their work?
2. Example: Find a specific example of probability in action (e.g., "70% chance of recovery").
3. Decision-making: How does probability help them make better decisions?
4. Impact: What could happen if they ignored probability?
5. Presentation: Create a poster or short presentation explaining your findings.
6. Reflection: Would you like to work in a field that uses probability? Why or why not?